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We claim:

1. A longitudinal recording head (22) for use with a magnetic recording medium (16), the longitudinal recording head (22) comprising:

first and second poles (51, 52) defining a non-uniform gap (54); and

means for concentrating magnetic flux between the first and second poles (51, 52) in the vicinity of the gap (54) to produce a localized magnetic field in the magnetic storage medium (16).

2. A longitudinal recording head (22) according to Claim 1, wherein the non-uniform gap (54) comprises a cavity.

3 A longitudinal recording head (22) according to Claim 2, wherein the cavity is curved.

4. A longitudinal recording head (22) according to Claim 2, wherein the cavity is cylindrical.

5. A longitudinal recording head (22) according to Claim 2, wherein the cavity comprises a substantially ellipsoidal or hemispherical shape.

6. A longitudinal recording head (22) according to Claim 5, wherein the cavity comprises at least one inwardly curved wall (64).

7. A longitudinal recording head (22) according to Claim 2, wherein the cavity has a length of from about 50 to about 300 nm, a width of from about 50 to about 300 nm, and a depth of from about 50 to about 500 nm.

8. A longitudinal recording head (22) for use with a magnetic recording medium (16), the longitudinal recording head (22) comprising:

first and second poles (51, 52); and

a non-uniform gap (54) defined by the first and second poles (51, 52).

9. A longitudinal recording head (22) according to Claim 8, wherein the non-uniform gap (54) comprises a cavity.

10 A longitudinal recording head (22) according to Claim 9, wherein the cavity is curved.

11. A longitudinal recording head (22) according to Claim 9, wherein the cavity is cylindrical.

12. A longitudinal recording head (22) according to Claim 9, wherein the cavity comprises a substantially ellipsoidal or hemispherical shape.

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13. A longitudinal recording head (22) according to Claim 12, wherein the cavity comprises at least one inwardly curved wall (64).

14. A longitudinal recording head (22) according to Claim 9, wherein the cavity has a length of from about 50 to about 300 nm, a width of from about 50 to about 300 nm, and a depth of from about 50 to about 500 nm.

15. A method of making a gap (54) between first and second poles (51, 52) of a longitudinal recording head (22) for use with a magnetic recording medium (16), the method comprising the steps of:

providing first and second adjacent poles (51, 52); and

creating a cavity between the first and second poles (51, 52).

16. The method according to Claim 15, wherein the step of creating a cavity is accomplished by removing material from at least one of the first and second poles (51, 52).

17. The method according to Claim 15, wherein the step of creating a cavity is accomplished using focused ion beam direct etching.

18. A method according to Claim 15, wherein the cavity is curved.

19. A method according to Claim 18, wherein the cavity comprises a substantially ellipsoidal or hemispherical shape.

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